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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

SHERMAN, STEPHEN G

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/733,401	Applicant(s) NAM ET AL.	
	Examiner STEPHEN G. SHERMAN	Art Unit 2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-8,10,11,13-15 and 19-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-8,10,11,13-15 and 19-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 30 June 2008 has been entered. Claims 1, 2, 4-8, 10, 11, 13-15 and 19-25 are pending. Claims 3, 9, 12 and 16-18 have been cancelled.

Response to Arguments

2. Applicant's arguments with respect to claims 1, 2, 4-8, 10, 11, 13-15 and 19-25 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

3. Claim 8 is objected to because of the following informalities:

Claim 8 recites "A method of driving a trans-reflective liquid crystal display device...the method comprising the steps of" then recites "forming a liquid crystal

display panel...”, “wherein the forming the liquid crystal display panel includes...”and “disposing a backlight...”, which are not limitations pertaining to a method of driving, but rather are limitations pertaining to a method of manufacturing. It is clear that the applicant is intending to claim a method of driving and as such, the limitations in question should be changed to correspond with the method of driving and not a method of manufacturing. Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1-2, 5-8, 11, 13-15, 19, 21-23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ha et al. (US 2003/0160920) in view of Ozawa et al. (US 2006/0152658) and further in view of Kubota et al. (US 2002/0171792) and Yamazaki (US 7,262,754).

Regarding claim 1, Ha et al. disclose a trans-reflective liquid crystal display device (Figure 8 and paragraph [0058]) comprising:

a plurality of data and gate lines defining a plurality of pixels (Figure 8 and paragraph [0059] explain that there are gate lines 104 and data lines 116), the pixels having a reflection region and a transmission region (Paragraph [0060] explains that the pixels are divided into an transmissive region "E" and a reflective region "F".);

a liquid crystal display panel with a TFT array substrate and a color filter substrate and a liquid crystal layer interposed therebetween (Figure 1 shows color filter substrate 15 and the TFT array substrate 21, with liquid crystal layer 14 in-between and explained in paragraph [0010]), wherein the liquid crystal display panel includes:

a TFT formed on the TFT array substrate (Figure 9 and the last sentence of paragraph [0065] explains that the gate electrode 102, the source electrode 112 and the drain electrode 114 form a thin film transistor "T".);

an organic layer formed on the TFT array substrate including the TFT (Figure 9 and paragraph [0065] explain that there is a first passivation layer 118 formed on the substrate, where paragraph [0067] explains that it is organic.);

a transmission hole formed in the organic layer and having a slanted side profile (Figure 9 and paragraph [0065] explain that there is a transmissive hole 122 which has an inclined portion 122a, i.e. a slanted side profile.);

a reflection electrode formed on an upper surface of the organic layer including the slanted side of the transmission hole (Figure 9 and paragraphs [0068]-[0069] explains that reflector 126 is formed on the first passivation layer 118 including the slanted side.);

a passivation layer formed on the reflection electrode and the transmission hole (Figure 9 and paragraph [0068] explains that there is a second passivation layer 128 formed on the reflector 126 and the transmission hole.);

a pixel electrode formed on the passivation layer and connected to the TFT (Figure 9 and paragraph [0072] explains that a transparent electrode 136 is formed on the second passivation layer 128 and connected to the drain electrode 114 of the TFT.);

a black matrix formed on the color filter substrate (Figure 1 and paragraph [0012] explain that there is a black matrix the color filter substrate 15.); and

color filter layers formed on portions of the color filter substrate corresponding to the reflection region (Figure 1 shows color filter layers 17), and

a backlight (Figure 2 shows backlight 41), wherein the backlight is turned on in a transmission mode and is turned off in a reflection mode (Paragraphs [0017]-[0019] explain that the backlight is on during transmissive mode and off during a reflection mode.), wherein the backlight is disposed under the TFT array substrate (Figure 2 shows that the backlight 41 is disposed under the substrate 21, and paragraph [0017]).

Ha et al. fails to explicitly teach:

- a timing controller that receives, converts, and outputs image data;
- a gate driver that receives a gate signal from the timing controller;
- a data driver that receives a data signal from the timing controller; and
- the liquid crystal display panel displaying the image according to a gate pulse and a data voltage applied by the gate driver and the data driver.

Ozawa et al. disclose a trans-reflective liquid crystal display device comprising a timing controller that receives, converts, and outputs image data (Figure 21 and paragraphs [0193]-[0194] explain that timing generator 573 controls the display-data outputting source 570 and the display-data processing circuit 571 to output display data.);

- a gate driver that receives a gate signal from the timing controller (Figure 12 shows a scanning driver circuit 157 as explained in paragraphs [0160] and [0195].);

- a data driver that receives a data signal from the timing controller (Figure 12 shows a data driver circuit 158 as explained in paragraphs [0160] and [0195].); and

- the liquid crystal display panel displaying the image according to a gate pulse and a data voltage applied by the gate driver and the data driver (Figure 13 and paragraphs [0160]-[0161] and [0169] explain that scanning and data drivers drive the scanning and data lines, which would be done by gate pulses and data voltages.).

Therefore, it would have been obvious to “one of ordinary skill” in the art at the time the invention was made to use the circuitry taught by Ozawa et al. in the trans-

reflective liquid crystal display device taught by Ha et al. in order to allow for the display to be driven properly to display an image.

Ha et al. and Ozawa et al. fail to explicitly teach
a switching unit that determines the output signal of the timing controller
according to a transmission mode or reflection mode;

that the backlight is a sequential backlight including red, green, and blue lamps;
and

a backlight controller connected to the sequential backlight to control the timing
of light emissions in the transmission mode.

Kubota et al. disclose a trans-reflective liquid crystal display device comprising
a switching unit that determines an output signal according to a transmission
mode or reflection mode (Paragraph [0089] explains that the backlight is turned off in
reflective mode and turned on in transmission mode, which means that the display
device is switched between the two mode, which inherently requires a switching unit in
order to switched between the modes.)

a sequential backlight including red, green, and blue lamps (Paragraph [0089]),
wherein the backlight is turned on in a transmission mode to sequentially transmit light
into the transmission region (Paragraph [0089] explains that red, green and blue light is
sequentially applied in the transmission mode.) and is turned off in a reflection mode
(Paragraph [0088] explains that the display is driven in the reflective mode in the same
manner as prior art reflective liquid crystal display panels, meaning that the backlight is
turned off during reflective mode. See paragraph [0005].); and

a backlight controller connected to the sequential backlight to control the timing of light emission in the transmission mode (Paragraph [0089] explains the timing is controlled to switch the three colors every 8 ms, which means that there is inherently a controller to control the timing.).

Therefore it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to use a sequential backlight as taught by Kubota et al. with the trans-reflective display taught by the combination of Ha et al. and Ozawa et al. in order to obtain a liquid crystal display device capable of displaying excellent images with low power consumption, regardless of the brightness of the surrounding environments (See Kubota et al., paragraph [0029]).

Although Ha et al. and Ozawa et al. disclose of the backlight being disposed under the TFT array and Kubota et al. discloses of using an RGB sequential back, the combination of Ha et al., Ozawa et al. and Kubota et al. fail to explicitly teach of the RGB backlight disposed under the TFT array.

Yamazaki discloses of a liquid crystal display device in which an RGB backlight is disposed under the TFT array (Figures 1A and 3 and column 2, line 66 to column 3, line 13).

Therefore, it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to use the teaching of Yamazaki in the liquid crystal display taught by the combination of Ha et al., Ozawa et al. and Kubota et al. such that the RGB backlight is disposed under the TFT array in order to provide more uniform light distribution across the display as opposed to a side-lit panel.

Regarding claim 2, Ha et al., Ozawa et al., Kubota et al. and Yamazaki disclose the trans-reflective liquid crystal display device of claim 1.

Kubota et al. also disclose wherein the color filter substrate includes a color filter formed in the reflection region (Paragraphs [0028]-[0029]).

Regarding claim 5, Ha et al., Ozawa et al., Kubota et al. and Yamazaki disclose the trans-reflective liquid crystal display device of claim 1.

Kubota et al. also disclose wherein the lamp backlight includes a light emitting diode (Paragraph [0089]).

Regarding claim 6, Ha et al., Ozawa et al., Kubota et al. and Yamazaki disclose the trans-reflective liquid crystal display device of claim 1.

Ozawa et al. also disclose wherein the cell gap between in the transmission region is twice that in the reflection region (Figure 6B shows that the cell gap in the transmission region, represented by d , can be seen to be twice the size of the gap in the reflection region.).

Regarding claim 7, Ha et al., Ozawa et al., Kubota et al. and Yamazaki disclose the trans-reflective liquid crystal display device of claim 1.

Kubota et al. also disclose wherein the timing controller divides one frame of display data into three sub-frames (Paragraph [0089] explains that the backlight is

switched every 8 mms dependent upon red, green and blue, meaning that there will be three sub-frames, one for each color.).

Regarding claim 8, this claim is rejected under the same rationale as claim 1.

Regarding claim 11, please refer to the rejection of claims 1 and 2, and furthermore Ozawa et al. also disclose a reflective electrode in the reflection region to reflect light incident from outside the liquid crystal panel (Figure 6B shows the reflecting electrode 4 as explained in paragraph [0118].).

Regarding claim 13, Ha et al., Ozawa et al., Kubota et al. and Yamazaki disclose the liquid crystal display device of claim 11.

Ozawa et al. also disclose wherein the liquid crystal panel includes:
a second substrate (Figure 6B shows substrate 20.); and
a liquid crystal layer between the first and second substrate (Figure 6B shows a liquid crystal layer 50.).

Regarding claim 14, Ha et al., Ozawa et al., Kubota et al. and Yamazaki disclose the liquid crystal display device of claim 11.

Ozawa et al. also disclose wherein the switching device includes a thin film transistor (Figure 18).

Regarding claim 15, this claim is rejected under the same rationale as claim 6.

Regarding claim 19, please refer to the rejection of claim 1.

Regarding claim 21, Ha et al., Ozawa et al., Kubota et al. and Yamazaki disclose the trans-reflective liquid crystal display of claim 1.

Kubota et al. also disclose wherein the light from the backlight passes through the color filter substrate unfiltered (Paragraphs [0028]-[0029]).

Regarding claim 22, Ha et al., Ozawa et al., Kubota et al. and Yamazaki disclose the method of claim 8.

Kubota et al. also disclose wherein the light from the backlight does not pass through a color layer (Paragraphs [0028]-[0029]).

Regarding claim 23, Ha et al., Ozawa et al., Kubota et al. and Yamazaki disclose the liquid crystal display device of claim 11.

Kubota et al. also disclose wherein the color layer is only in the reflective region (Paragraphs [0028]-[0029]).

Regarding claim 25, this claim is rejected under the same rationale as claims 11 and 13-15.

7. Claims 4, 10, 20 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ha et al. (US 2003/0160920) in view of Ozawa et al. (US 2006/0152658) and further in view of Kubota et al. (US 2002/0171792), Yamazaki (US 7,262,754) and Kodama et al. (US 6,642,916).

Regarding claim 4, Ha et al., Ozawa et al., Kubota et al. and Yamazaki disclose the trans-reflective liquid crystal display device of claim 1.

Ha et al., Ozawa et al., Kubota et al. and Yamazaki fail to explicitly teach wherein the data driver includes a MUX circuit shorting three adjacent data lines, the MUX circuit being turned on in the transmission mode and turned off in the reflection mode.

Kodama et al. discloses of a liquid crystal display device which includes a MUX circuit for shorting three adjacent data lines (Figure 5 shows that three adjacent data lines are shorted together, while Figure 6 shows that adjacent data lines are shorted together.).

Therefore, it would have been obvious to “one of ordinary skill” in the art at the time the invention was made to use the shorting circuit as taught by Kodama et al. in the trans-reflective liquid crystal display device taught by the combination of Ha et al., Ozawa et al., Kubota et al. and Yamazaki such that the shorting circuit will be turned on in the transmission mode and turned off in the reflection mode in order to allow for color images to be created by the sequential backlight in the transmission mode and by the color filter during the reflection mode.

Regarding claim 10, please refer to the rejection of claim 4.

Regarding claim 20, this claim is rejected under the same rationale as claim 4.

Regarding claim 24, this claim is rejected under the same rationale as claims 1-2 and 4.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Art Unit: 2629

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEPHEN G. SHERMAN whose telephone number is (571)272-2941. The examiner can normally be reached on M-F, 8:00 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Stephen G Sherman/
Examiner, Art Unit 2629

/Amr Awad/
Supervisory Patent Examiner, Art Unit 2629

16 December 2008